

# Shuxin Ding

Associate Researcher

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## Education

Ph.D., School of Automation, Beijing Institute of Technology, Beijing, 2012.9-2019.1. Adviser: Chen Chen and Bin Xin.

Visiting Scholar (Joint Ph.D. Student), Center for Applied Optimization, Industrial and Systems Engineering, University of Florida, Gainesville, FL, 2016.9-2017.9. Adviser: Panos M. Pardalos.

B.Eng. in Electronic and Information Engineering, Exchange Student, The Hong Kong Polytechnic University, Hong Kong, 2011.1-2011.6.

B.Eng. in Automation, Beijing Institute of Technology, Beijing, 2008.9-2012.6.

## Employment

Associate Researcher, Signal and Communication Research Institute, China Academy of Railway Sciences Corporation Limited, 2021.9-present.

Assistant Researcher, Signal and Communication Research Institute, China Academy of Railway Sciences Corporation Limited, 2019.7-2021.9.

## Research Interests

Railway Scheduling, Evolutionary Computation, Optimization under Uncertainty, Multi-objective Optimization.

## Publications

### *Papers under review/revision*

1. S. Ding, T. Zhang\*, C. Chen\*, Y. Lv, B. Xin, Z. Yuan, R. Wang, P. M. Pardalos. "An Efficient Particle Swarm Optimization with Evolutionary Multitasking for CVaR-based Stochastic Area Coverage of Heterogeneous Sensor Deployment". *IEEE Systems Journal*, 2022, prepared to submit.
2. R. Wang, Q. Zhang\*, X. Dai, T. Zhang, S. Ding, Y. Jin. "An Efficient Evolutionary Algorithm for High-Speed Train Rescheduling Under a Partial Station Blockage". *Applied Soft Computing*, 2022, prepared to submit.
3. J. Cai, Z. Peng\*, S. Ding, J. Sun. "Problem specific MOEA/D for robust resource scheduling of multi-agent system for area searching". *Expert Systems with Applications*, 2022, prepared to submit.

4. X. Wu, C. Chen\*, S. Ding, K. Meng. "A weapon target assignment under uncertainty using modified MOEA/D with heuristic initialization and adaptive operator". *Expert Systems with Applications*, 2022, submitted.
5. L. Jiao, Z. Peng\*, L. Xi, M. Guo, S. Ding. "A multi-stage heuristic algorithm based on task grouping for vehicle routing problem with energy constraint in disasters". *Expert Systems with Applications*, 2022, submitted.
6. J. Cai, Z. Peng\*, S. Ding, Z. Wang, Y. Wei. "A problem-specific parallel pareto local search for the reactive decision support of a special RCPSp extension". *Complex & Intelligent Systems*, 2022, submitted.
7. J. Wu, C. Pu\*, S. Ding, G. Cao, P. M. Pardalos. "Multi-objective optimization of transport processes on complex networks". *IEEE Transactions on Network Science and Engineering*, 2021, revise.

### Book

1. S. Ding, C. Chen, Q. Zhang, B. Xin, P. M. Pardalos. *Metaheuristics for Resource Deployment under Uncertainty in Complex Systems*. Boca Raton FL, USA: CRC Press, 2021.

### Journal Articles

1. L. Yan, Q. Zhang\*, S. Ding, R. Wang. "High-Speed Railway Train Operation Adjustment Based on Bi-Objective Optimization". *Zhongguo Tiedao Kexue/China Railway Science*, 2022, 43(2): 161-171.
2. R. Wang, Q. Zhang\*, L. Yan, S. Ding. "An Online Deductive Approach of Train Operation Situation under an Area Temporary Speed Restriction". *Tiedao Yunshu Yu Jingji/Railway Transport and Economy*, 2022, accepted.
3. S. Ding, T. Zhang\*, Z. Liu, R. Wang, S. Lu, B. Xin, Z. Yuan. "A Memetic Algorithm for High-Speed Railway Train Timetable Rescheduling". *Journal of Advanced Computational Intelligence and Intelligent Informatics*, 2022, 26(3): 407-417.
4. S. Ding, T. Zhang\*, R. Wang, Z. Yuan. "Research on Train Platform Scheme Rescheduling at High-speed Railway Station". *Tiedao Tongxin Xinhao/Railway Signalling & Communication*, 2022, accepted.
5. R. Wang, Q. Zhang\*, T. Zhang, P. Lin, S. Ding, Z. Yuan. "Real-time rescheduling approach of train operation for high-speed railways using problem-specific knowledge under a station blockage". *SCI-ENTIA SINICA Informationis*, 2022, accepted.
6. L. Jiao, Z. Peng\*, L. Xi, S. Ding, J. Cui. "Multi-agent coverage path planning via proximity interaction and cooperation". *IEEE Sensor Journal*, 2022, 22(6): 6196-6207.
7. C. Chen, X. Wu\*, J. Chen, P. M. Pardalos\*, S. Ding. "Dynamic grouping of heterogeneous agents for exploration and strike missions". *Frontiers of Information Technology & Electronic Engineering*, 2022, 23(1): 86-100.
8. J. Cai, Z. Peng\*, S. Liao, S. Ding. "A multi-mode multi-skill project scheduling reformulation for reconnaissance mission planning". *SCIENCE CHINA Information Sciences*, 2022, 65(6), 169201.
9. R. Wang, Q. Zhang\*, T. Zhang, T. Wang, S. Ding. "An Intelligent Rescheduling Approach of High-speed Train Operation based on Reinforcement Learning". *Zhongguo Tiedao Kexue/China Railway Science*, 2021, accepted.
10. L. Yan, Q. Zhang\*, R. Wang, S. Ding. "Train Operation Analysis Based on Dynamics". *Tiedao Yunshu Yu Jingji/Railway Transport and Economy*, 2021, 43(8): 64-70.

11. Y. Ren, Q. Zhang\*, Z. Yuan, T. Wang, S. Ding, Z. Li. "Optimization of train platform utilization at high-speed railway stations based on arrival and departure distribution of trains". *Harbin Gongye Daxue Xuebao/Journal of Harbin Institute of Technology*, 2021, 53(8): 137-143.
12. X. Wu, C. Chen\*, S. Ding. "A modified MOEA/D algorithm for solving bi-objective multi-stage weapon-target assignment problem". *IEEE Access*, 2021, 9: 71832-71848.
13. J. Cai, Z. Peng\*, S. Ding, J. Sun. "Problem-specific multi-objective invasive weed optimization algorithm for reconnaissance mission scheduling problem". *Computers & Industrial Engineering*, 2021, 157, 107345.
14. L. Yan, T. Zhang, Y. Gao, R. Wang, S. Ding\*. "Reliability analysis of station autonomous computer system based on fuzzy dynamic fault tree and Markov model". *Engineering Reports*, 2021, 3(8), e12376.
15. Y. Sun, Q. Zhang\*, Z. Yuan, Y. Gao, S. Ding. "Quantitative analysis of human error probability in high-speed railway dispatching tasks". *IEEE Access*, 2020, 8: 56253-56266.
16. W. Xu, C. Chen\*, S. Ding, P. M. Pardalos. "A bi-objective dynamic collaborative task assignment under uncertainty using modified MOEA/D with heuristic initialization". *Expert Systems with Applications*, 2020, 140, 112844.
17. Q. Zhang, Z. Yuan\*, L. Yan, T. Zhang, Y. Miao, S. Ding. "A Railway Train Number Tracking Method Using a Prediction Approach". *IEEE Access*, 2019, 7: 138288-138298.
18. S. Ding, C. Chen\*, B. Xin, P. M. Pardalos. "A bi-objective load balancing model in a distributed simulation system using NSGA-II and MOPSO approaches". *Applied Soft Computing*, 2018, 63: 249-267.
19. S. Ding, C. Chen\*, B. Xin, J. Chen, "Status and progress in deployment optimization of firepower units". *Kongzhi Lilun Yu Yingyong/Control Theory and Applications*, 2015, 32(12): 1569-1581.
20. S. Ding, C. Chen\*, J. Chen, B. Xin, "An Improved Particle Swarm Optimization Deployment for Wireless Sensor Networks". *Journal of Advanced Computational Intelligence and Intelligent Informatics*, 2014, 18(2): 107-112.

## Proceedings

1. G. Gao, B. Xin\*, Y. Mei, S. Lu, S. Ding. "A Multi-objective Evolutionary Algorithm with New Reproduction and Decomposition Mechanisms for the Multi-Point Dynamic Aggregation Problem". In *Proceedings of the 2022 Genetic and Evolutionary Computation Conference*, July 9-13, 2022, Boston, USA. ACM, New York, NY, USA, accepted.
2. S. Ding\*, T. Zhang, R. Wang, C. Zhang, S. Lu, B. Xin\*. "A Comparative Study on Evolutionary Algorithms for High-Speed Railway Train Timetable Rescheduling Problem". *The 7th International Workshop on Advanced Computational Intelligence and Intelligent Informatics (IWACIII2021)*, Beijing, China. 2021: 1-6.
3. S. Ding, R. Wang, X. Zhou, Y. Ren, K. Huang\*. "High-Speed Railway Train Timetable Rescheduling in Case of a Stochastic Section Blockage". *2021 Chinese Automation Congress (CAC)*, Beijing, China. 2021: 4322-4327.
4. S. Ding, Q. Zhang\*, Z. Yuan. "An under-approximation for the robust uncertain two-level cooperative set covering problem". *2020 59th IEEE Conference on Decision and Control (CDC)*, Jeju Island, Republic of Korea. IEEE, 2020: 1152-1157.

5. J. Cai, Z. Peng\*, S. Ding, J. Sun. "A Robust Genetic Algorithm to Solve Multi-Skill Resource Constrained Project Scheduling Problem with Transfer Time and Uncertainty Skills". *2020 IEEE 16th International Conference on Control & Automation (ICCA)*, Sapporo, Hokkaido, Japan. IEEE, 2020: 1584-1589.
6. Y. Wei, S. Ding, H. Fang\*, X. Zeng, Q. Yang, B. Xin. "Distributed Nonsmooth Robust Resource Allocation with Cardinality Constrained Uncertainty". *2019 Chinese Control Conference (CCC)*, Guangzhou, China. IEEE, 2019: 5758-5763.
7. X. Sun\*, S. Ding. "Bunker hedging with expected loss control by buffered probability of exceedance and conditional value-at-risk". In *Annual Conference of the International Association of Maritime Economists (IAME)*, Kyoto, Japan. 2017.
8. Z. Sun\*, S. Ding. "Research on Standardized Development Method of Scenario for Combat Information Simulation System". In *Proceedings of 33rd Chinese Control Conference (CCC)*, Nanjing, China. IEEE, 2014: 6298-6303.
9. S. Ding, J. Chen, C. Chen\*, B. Xin. "An improved deployment algorithm for wireless sensor networks based on Particle Swarm Optimization". In *Proceedings of the Ninth China-Japan International Workshop on Internet Technology and Control Applications*, Beijing, China. 2013: 138-142.

## Reviewer for Journals

Annals of Mathematics and Artificial Intelligence  
 Applied Soft Computing  
 Complexity  
 IEEE Access  
 IEEE Transactions on Circuits and Systems II: Express Briefs  
 IEEE Transactions on Cybernetics  
 Journal of Advanced Computational Intelligence and Intelligent Informatics  
 Journal of Advanced Transportation  
 Soft Computing  
 Transportation Research Part B: Methodological  
 Unmanned Systems  
 Zidonghua Xuebao/Acta Automatica Sinica

## Reviewer for Conferences

Chinese Automation Congress (CAC)  
 Chinese Control and Decision Conference (CCDC)  
 Chinese Control Conference (CCC)  
 International Workshop on Advanced Computational Intelligence and Intelligent Informatics (IWACIII)

## Research Experience

Principal Investigator, Research on the train scheduling and decision making system under uncertainty, Foundation of China Academy of Railway Sciences Corporation Limited, No. 2019YJ071, 2019.10-2020.12.

Participant, Theory and methodology of autonomous cooperative operation control in high-speed railway, National Natural Science Foundation of China, No. U1934220, 2020.01-2023.12.

Participant, Command control and decision making in multi platform under uncertainty, National Natural Science Foundation of China, No. 61773066, 2018.01-2021.12.

Participant, Research on the dynamic fire allocation in network-centric warfare, National Natural Science Foundation of China, No. 61304215, 2014.01-2016.12.

Participant, Optimization and decision making in Networked Fire Control System Deployment under dynamic environment, National Natural Science Foundation of China, No. 61203181, 2013.01-2015.12.

Participant, Dynamic deployment optimization analysis in Networked Fire Control System, Fundamental Research Funds for Beijing Institute of Technology, No. 20120642004, 2013.01-2013.12

## Teaching

### *Beijing Institute of Technology*

Final Year Project (B.Eng.): Instructor Assistant, 2014.

Wings' Project funded by Beijing Municipal Commission of Education: Instructor, 2013-2014.

## Honors and Awards

IWACIII 2021 Session Best Presentation Award, 2021

Innovation Award (second place) from the Ministry of Industry and Information Technology, 2018

Outstanding Reviewer, Applied Soft Computing (Elsevier), 2018.

JACIII Young Researcher Award, 2017.

Second Prize in National Postgraduate Mathematic Contest in Modeling, 2013.

Outstanding Postgraduate Student, 2012-2013.

Third Prize in the Programming Contest in Beijing Institute of Technology, 2012/2013.

Second Prize in National Undergraduate Electronic Design Contest, 2011.

Five-time recipient of People's Scholarship in Beijing Institute of Technology, 2008-2012.